

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
10 February 2005 (10.02.2005)

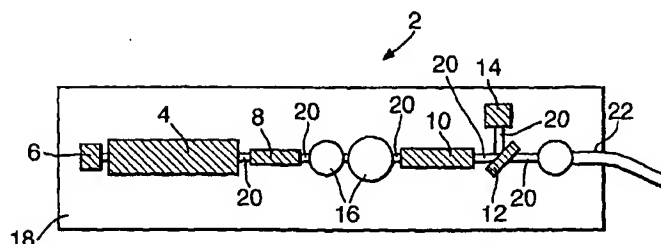
PCT

(10) International Publication Number
WO 2005/012970 A1

- (51) International Patent Classification⁷: **G02B 6/42**, 6/12
- (21) International Application Number:
PCT/GB2004/003192
- (22) International Filing Date: 23 July 2004 (23.07.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0317630.2 28 July 2003 (28.07.2003) GB
- (74) Agents: DUNN, Paul, E. et al.; QinetiQ Ltd, IP Formalities, Cody Technology Park, A4 Building, Room G016, Ively Road, Farnborough, Hampshire GU14 0LX (GB).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (71) Applicant (for all designated States except US): QINETIQ LIMITED [GB/GB]; 85 Buckingham Gate, London SW1E 6PD (GB).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): MCNIE, Mark, E. [GB/GB]; QinetiQ Limited, Malvern Technology Centre, Room E9A4, St Andrew's Road, Malvern, Worcestershire WR14 3PS (GB). JENKINS, Richard, M. [GB/GB]; QinetiQ Limited, Malvern Technology Centre, Room PA109, St Andrew's Road, malvern, Worcestershire WR14 3PS (GB). MCQUILLAN, James [GB/GB]; QinetiQ Limited, Malvern Technology Centre, Room DX101A, St Andrews Road, Malvern, Worcestershire WR14 3PS (GB).
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Declaration under Rule 4.17:**
— of inventorship (Rule 4.17(iv)) for US only
- Published:**
— with international search report

[Continued on next page]

(54) Title: MONOLITHIC OPTICAL TRANSMITTER AND RECEIVER APPARATUS INCORPORATING HOLLOW WAVEGUIDES



(57) Abstract: A transmitter apparatus (2) is described that comprises one or more lasers (4), modulation means (10) to intensity modulate radiation output by each of said one or more lasers (4), and output means for outputting the modulated radiation produced by the modulation means into, for example, an optical fibre (22). The apparatus comprises hollow core optical waveguides (20) formed in a substrate (18) which, in use, guide radiation from the one or more lasers (4) to the modulation means (10) and from the modulation means (10) to the output means. An associated receiver apparatus (30) is also described that comprises one or more detectors (32) and one or more optical fibre attachment means, the one or more optical fibre attachment means being arranged to receive one or more one optical fibres (42). The receiver is characterised in that radiation is guided from the one or more optical fibres (42) to the one or more detectors (32) by at least one hollow core optical waveguide (40) formed in a substrate. A combined receiver/transmitter apparatus (70) is also shown.

WO 2005/012970 A1

WO 2005/012970 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.